

INTERMOUNTAIN POWER PROJECT

PRELIMINARY AIR

QUALITY REVIEW

Prepared

By

John A. Avalos

Under

Supervision

of

W. W. Pepper

September 1979

IP11\_002024

## TABLE OF CONTENTS

|      |                      |     |
|------|----------------------|-----|
| I.   | INTRODUCTION.....    | 1   |
| II.  | INVESTIGATIONS.....  | 2-4 |
| III. | ANALYSIS.....        | 5-7 |
| IV.  | CONCLUSIONS.....     | 8   |
| V.   | RECOMMENDATIONS..... | 9   |

## I. INTRODUCTION

Task AQL2 was established for the purpose of determining:

- a. the impact on IPP of the revised New Source Performance Standards (NSPS) promulgated by Environmental Protection Agency (EPA) on June 11, 1979, and
- b. the feasibility of using dry scrubbing at possibly lower than 90 percent removal efficiency, as provided for in the revised NSPS for low-sulfur western coal, in lieu of the 90 percent removal wet scrubbing system proposed in the original feasibility study for IPP.

## II. INVESTIGATIONS

The New Source Performance Standards adopted by EPA on June 11, 1979, were reviewed and discussions were held with Mr. Jim Bowers, H. E. Cramer Co., Inc., air quality consultants to IPP, on the possible impact to the air quality analysis conducted for the proposed project at the Lynndyl site.

The adopted standards apply to construction or modifications to commence after September 18, 1978, and are therefore applicable to IPP.

Discussions were held on July 20 and August 1, 1979, with Messrs. Al Rickers and Brent Bradford, Director and Assistant Director, respectfully, of the Utah Bureau of Air Quality, on the possible impact of the revised NSPS on IPP and on the Utah revised State Implementation Plan (SIP) under review by EPA for conformance to the requirements of the Clean Air Act Amendments of 1977. It is their opinion that the revised standards will be proposed to be included in the revised SIP during a public hearing scheduled for October 1979. Mr. Rickers feels that EPA will approve the Utah SIP in November 1979, and delegate full authority for PSD review and approval to his office at this time.

The Utah Air Conservation Regulations adopted in February 1979, removed the absolute requirement for a 90 percent SO<sub>2</sub> removal and instead adopted a more comprehensive definition for Best Available Control Technology (BACT) where the maximum degree of reduction required for any pollutant subject to these regulations is determined on a case-by-case basis by the Air Conservation Committee, taking into account energy, environmental and economic impacts, and achievable through the application of production processes and available methods, systems and techniques. Mr. Bradford felt that the Air Conservation Committee would look favorably at a dry scrubbing system at an efficiency lower than the proposed 90 percent removal efficiency, if it can be substantiated per the above criteria and that the biggest concern in varying from 90 percent would be that efficiency removal percentage that would be required in complying with the Class II PSD criteria.

The impact on the Notice of Intent to Construct (NOI) by revising the SO<sub>2</sub> control scheme per the revised NSPS was discussed on July 20, 1979, with Mr. Jim Lehr, Assistant Director of the Air and Hazardous Materials, EPA, Region VIII. Mr. Lehr took a very conservative stand on the impact of substituting "dry" scrubbing for the proposed wet scrubbing system. He is of the opinion that a new application would be required if "dry" is substituted for "wet" even if the efficiency removal remains at the proposed 90 percent. This is contrary to the opinion expressed by

Mr. Jim Rakers, who is coordinating the PSD permit application processing for EPA, in a meeting held with him to discuss this subject in February 1979. Mr. Lehr stated that if an efficiency level below 90 percent with dry scrubbing be proposed, a new application and a new air quality assessment would be required. The requirement for a new application submittal would result in "restarting the clock" and would allow EPA up to one year to render a decision on the permit.

In a followup discussion on this subject on August 8, 1979, with Mr. Norm Huey, Mr. Rakers supervisor, Mr. Huey stated that a determination as to whether or not "the clock would start over" if IPP were to change from wet to dry scrubbing is a legal issue which he is not able to address. However, he did point out that EPA intends to review all energy-related projects as rapidly as possible.

Mr. Huey concluded that if IPP decided to use dry scrubbing after having received an EPA permit based on wet scrubbing an "amendment" would be required. If the removal efficiency remains at 90 percent, the project can modify the granted permit in the future more easily than if the removal efficiency is reduced.

#### Particulate and Opacity Standards

The adopted NSPS for particulate matter is 0.03 lbs/10<sup>6</sup> Btu heat input. The plume opacity shall not exceed 20 percent over a six-minute average period.

#### SO<sub>2</sub> Standard

The adopted SO<sub>2</sub> standards significantly reduce the percentage reduction requirement for low-sulfur western coals.

This reduction from the previous 90 percent to possibly as low as 70 percent, on a 30-day average, is intended to allow the use of dry scrubbing technology for SO<sub>2</sub> emission control.

#### NOx Standard

The adopted NSPS for NOx emission, if the coal burned is subbituminous, is 0.5 lbs per million Btu. For bituminous coal, the standard is 0.6 lbs per million Btu. IPP may burn a mixture of bituminous and subbituminous coal. EPA's adopted standards require that when two or more fuels are burned, the applicable standard be determined by proration of the affected standards. The applicable standard for IPP will be between 0.5 and 0.6 lbs per million Btu.

### Dry Scrubbing

Four vendors and one consultant were contacted to determine if dry sulfur scrubbing is capable of 90 percent SO<sub>2</sub> removal from the flue gases of a large utility boiler burning low-sulfur western coal. All five sources felt that 90 percent scrubbing was well within the state of the art; in fact, each of the vendors has demonstrated at least 90 percent scrubbing in pilot plant testing. The pilot plant testing is important since there are no full-size dry scrubbing systems in commercial operation as yet; although several utilities have requested "dry only" bids or purchased dry systems for future facilities, and one dry system is presently under construction.

The cost estimates for dry scrubbing are generally equal to or less than those for wet scrubbers.

### III. ANALYSIS

#### New Source Performance Standards (NSPS)

1. Particulate Standard (P/M) - The preliminary IPP design utilizes a hotside electrostatic precipitator to control particulate emissions. The estimated P/M emissions of 0.017 lbs per million Btu input with this equipment are well within the adopted standard of 0.03 lbs per million Btu. EPA and the Utah Bureau of Air Quality have both expressed the opinion that compliance with the P/M standard through the performance of a well designed and operated ESP or baghouse implies compliance with the opacity limit of 20 percent.
2. SO<sub>2</sub> Standard - The preliminary design of the SO<sub>2</sub> emission control equipment for IPP utilizes wet scrubbing technology to reduce SO<sub>2</sub> emissions by 90 percent. During preliminary design, the project was constrained by the State of Utah, Bureau of Air Quality's requirement of a minimum 90 percent SO<sub>2</sub> removal. However, the State of Utah has since adopted a revised version of their Air Quality Regulations (February 1979) which removed the absolute 90 percent removal efficiency and adopted a definition for BACT which allows emerging technology such as dry scrubbing to be considered for low-sulfur coal. Preliminary calculations by the project indicate that a minimum removal efficiency of 82 percent is required before the 24-hour Class II PSD standard is violated. The percentage figure is based on the assumption that the exit flue gas temperature of 170 deg F does not change in "wet" vs. "dry" scrubbing. The Utah Bureau of Air Quality expressed the opinion that IPP could submit a letter to them proposing a substitution of dry scrubbing at 82 percent efficiency for the wet scrubbing system and 90 percent removal originally proposed. This proposal would have to be accompanied by an air quality assessment for 82 percent removal and taking into account energy and economic impacts and other costs. If the Class II PSD increments can be met at this lower efficiency, the opinion was expressed that the Utah Air Conservation Committee would rule favorably for the proposal.

In preliminary discussions with EPA on the possibility of substituting dry for wet scrubbing at the same or lower efficiency than proposed in the NOI, they expressed the opinion that a new NOI application for PSD review would be required and that the entire review

and approval process would begin all over again. This requirement could result in a one-year's delay in receiving a PSD permit to construct. This very rigid interpretation by EPA will be pursued further, it not being consistent with previous discussions or noticed EPA policies.

3. NOx Standard - The applicable standard for IPP will be between 0.5 and 0.6 lbs per million Btu. Current estimated emissions are 0.7 lbs per million Btu and were based on the previous NSPS Standard which was at this level. Boiler designers would only guarantee this level of emissions at the time of the feasibility study. Boiler manufacturers contacted since the revised NSPS Standards were adopted indicate that their boiler designs can meet the new NSPS Standards.
4. Dry Scrubbing - Atomics International/Wheelabrator-Fry, Babcock & Wilcox, Carborundum Co., Joy Manufacturing/Niro Atomizer, and Mr. A. Slack were contacted to determine the SO<sub>2</sub> removal efficiencies and costs of various dry scrubbing systems. The maximum SO<sub>2</sub> removal efficiencies were estimated at 90 percent by the manufacturers based on pilot plant testing. The actual guarantee depends upon fuel properties and site specific items.

The cost figures are estimates at best and are also highly dependent upon site specific details especially at the higher removal efficiencies, but it appears that a dry system can be competitive with a wet system both for capital and operating costs.

When considering a dry system to remove SO<sub>2</sub>, Mr. A. Slack has stated that it is important to recognize two important facts. First, a full-size commercially operational dry scrubber does not exist, so the major source of technical and economic information is from the vendors rather than the operating utilities. Second, since dry scrubbing is a relatively new technology, the state of the art is advancing at a comparatively rapid pace. For example, one vendor claims to have made major advances in their process in the past year.

Other utilities, vendors and architect/engineering firms seem to believe that dry scrubbing is a cost effective, technologically sound approach to SO<sub>2</sub> removal for low-sulfur western coal. At least four utilities that are presently using wet scrubbing at existing sites have requested bids for "wet or dry",



or "dry only" systems for future units at the same sites. One of the four utilities is Utah Power & Light. Two other vendors (Research Cottrell and Envirotech) are developing dry scrubbers even though they presently have commercially proven wet scrubbers indicating that these two companies believe dry scrubbing to be better than wet in some applications.

#### IV. CONCLUSIONS

1. The estimated IPP emissions for SO<sub>2</sub>, particulate matter and plume opacity are in conformance with the revised NSPS for these pollutants. The boiler specifications must be revised to specify that the boiler design must guarantee conformance with the 0.5 and 0.6 lbs NOx per million Btu NSPS for bituminous and subbituminous coals, respectively. The boiler manufacturers contacted have indicated their ability to comply. Because of this conformance, the air quality analysis performed by the H. E. Cramer Co., Inc., for the Lynndyl site is not affected. A new air quality analysis must be performed if the scrubbing efficiency removal for SO<sub>2</sub> is reduced.
2. Dry scrubbing is a viable candidate system along with wet scrubbing for IPP for SO<sub>2</sub> removal because of its potential advantages. From a regulatory viewpoint, the Utah Bureau of Air Quality has revised its Air Conservation Regulations to provide for serious consideration of this technology. EPA has indicated its acceptance of this technology by its allowance for lower removal efficiencies for low-sulfur western coal in the recently adopted NSPS for SO<sub>2</sub>. However, EPA Region VIII officials seem to be taking a very conservative and strict interpretation of the preconstruction requirements for a PSD permit and are tentatively requiring a new application and air quality assessment with the "clock" starting all over again in the time allowed EPA to render a decision on the permit application. "Restarting the clock" is a legal issue that requires further discussions with EPA's legal staff.

## V. RECOMMENDATIONS

1. Complete an in-depth feasibility study of dry scrubbing as a viable alternate to wet scrubbing, (Air Quality Control Equipment Review Task).
2. Discuss further with EPA, Region VIII, officials to clarify the impact on their review of IPP's PSD permit application (NOI) if in-depth studies of pollution control equipment determines that dry scrubbing and baghouses should be substituted in place of the proposed wet scrubbing and electrostatic precipitators. Discuss also the impacts of reducing the SO<sub>2</sub> removal efficiency if dry scrubbing is proposed to be used.

It is further recommended that dry scrubbing not be officially proposed to EPA and the Utah Bureau of Air Quality as a substitute to the wet scrubbing, 90 percent removal system presently being proposed, until the Air Quality Control Equipment Review Task is complete and until EPA has completed the PSD permit application review and issues the PSD permit.